

Name: _____

at1124exam: Radicals and Squares (v812)

Question 1

Simplify the radical expressions.

$$\sqrt{98}$$

$$\sqrt{28}$$

$$\sqrt{50}$$

$$\frac{\sqrt{7 \cdot 7 \cdot 2}}{7\sqrt{2}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 7}}{2\sqrt{7}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 2}}{5\sqrt{2}}$$

Question 2

Find all solutions to the equation below:

$$3((x - 8)^2 + 7) = 69$$

First, divide both sides by 3.

$$(x - 8)^2 + 7 = 23$$

Then, subtract 7 from both sides.

$$(x - 8)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 8 = \pm 4$$

Add 8 to both sides.

$$x = 8 \pm 4$$

So the two solutions are $x = 12$ and $x = 4$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 12x = -27$$

$$x^2 - 12x + 36 = -27 + 36$$

$$x^2 - 12x + 36 = 9$$

$$(x - 6)^2 = 9$$

$$x - 6 = \pm 3$$

$$x = 6 \pm 3$$

$$x = 9 \quad \text{or} \quad x = 3$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 + 30x + 81$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 + 10x) + 81$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 + 10x + 25 - 25) + 81$$

Factor the perfect-square trinomial.

$$y = 3((x + 5)^2 - 25) + 81$$

Distribute the 3.

$$y = 3(x + 5)^2 - 75 + 81$$

Combine the constants to get **vertex form**:

$$y = 3(x + 5)^2 + 6$$

The vertex is at point $(-5, 6)$.